What is claimed is:

1. A functional surface having low non-specific binding characteristics for non-target analytes comprising

a substrate having an effective amount of active component;

an effective amount of cross-linking component;

and an effective amount of matrix-forming component;

whereby said active component, said cross-linking component and said matrix-forming component form an integrally enmeshed matrix that provides a functionalized surface having low non-specific binding characteristics for non-target molecules in external milieu. .

2. The functional surface of claim 1, wherein said active component includes a functional group, a spacer group and a binding group.

3. The functional surface of claim 2, wherein said functional group facilitates selective binding to target analytes and is selected from the group consisting of biotin, methoxy-polyethylene glycol, N-hydroxy succinimide esters, nitrophenyl esters, carboxylates, vinyls, nitrenes, aldehyde groups, phenylboronic acid, salicylhydroxamic acid, hydroxyl groups, amine groups, imine groups, carboxylic acids, aldehydes, ketones, esters, ethers, amide groups, imides, cyanides, hydrazides, succinimides, maleimide, thiols, halides, azido groups, phenyl groups, sulfonates, isothiocyante, isocyanate, oxazolines, epoxides, nitrobenzyls, oxazoline, acid chloride, chloroformate, disulfide pyridyl, azlactone, cyanogens bromide, fluoroarenes, fluorocarbons, disulfides, isocyanides, sulfates, heparin, peptides, nucleotides, polynucleotides, organic silicon compounds and organic phosphate compounds, ethylene glycol oligomers, acrylamides, pyrollidones, polysaccharides and polar synthetic polymers.

4. The functional surface of claim 2, wherein said functional group facilitates selective binding to target analytes and is biotin, methoxy-polyethylene glycol, succinimidyl proprionate, streptavidin, or aldehyde.

5. The functional surface of claim 2, wherein said functional group facilitates selective binding to target analytes and is biotin.

6. The functional surface of claim 2, wherein said spacer group is selected from the group consisting of bifunctional, linear, star-shape, and comb-like polyethylene glycols, polyethylenimines, polystyrene, polysiloxanes, polyurethanes, proteins, poly(amino acids), polyphosphazenes, telechelic block copolymers, polyacrylates, polyacrylamides, polymethacrylates, polysaccharides, dendrimers, hyperbranched polymers.

7. The functional surface of claim 2, wherein said spacer group is a linear polyethylene glycol, star-shape PEG molecule, or a comb-like PEG molecule.

8. The functional surface of claim 2, wherein said spacer group is a linear PEG molecule.

9. The functional surface of claim 2, wherein said binding group is selected from the group consisting of silanes, methacrylates, disulfides, disilazanes, sulfhydryls, acrylates, carboxylates, isonitriles, isocyanates. and phosphoamidites, nitrenes, epoxides, hydrosilyl, esters, arenes, azidos, nitriles, quinones, and vinyl groups.

10. The functional surface of claim 2, wherein said binding group is alkoxysilane or chlorosilane.

11. The functional surface of claim 2, wherein said binding group is an alkoxysilane.

12. The functional surface of claim 1, wherein said cross-linking component is a molecule comprised of at least two reactive groups selected from the list consisting of methacrylates, acrylates, epoxides, silanes, perfluorophenyl azides, aryl azides, acyl azides, azidoformates, sulfonyl azides, phosphoryl azides, diazoalkanes, diazoketones, diazoacetates, beta-keto-alpha-diazoacetates, aliphatic azo, diazirines, ketenes, photoactivated ketones, dialkyl peroxidases, diacyl peroxidases, and quinones.

13. The functional surface of claim 1, wherein said cross-linking component is azido silane.

14. The functional surface of claim 1, wherein said matrix-forming component is selected from the group consisting of polyoxyethylene-based surface-active substances, including, polyoxyethylene sorbitan tetraoleate, polyoxyethylene sorbitol hexaoleate, polyoxyethylene 6 tridecyl ether, polyoxyethylene 12 tridecyl ether, polyoxyethylene 18 tridecyl ether, Tween® surfactants, Triton® surfactants, polyoxyethlene-polyoxypropylene

copolymers, linear PEG molecules, star-shaped PEG molecules, comb-shaped and dendrimeric, hyperbranched PEG molecules, linear, star, and dendrimer polyamine polymers, carbonated, perfluorinated and siliconated surfactants, and casein, serum dilutions, bovine serum albumin, glycolipids and lipids, heparin or other glycosaminoglycans, muscin and polysaccharides

15. The functional surface of claim 1, wherein said matrix forming component is polyoxyethylene sorbitan tetraoleate, Tween® surfactant, or Pluronic® block co-polymers, or synthetic non-ionic polar hydrophilic copolymers of similar chemical composition.

16. The functional surface of claim 1, wherein said matrix forming component is polyoxyethylene sorbitan tetraoleate.

17. The functional surface of claim 1, wherein said active component is biotin-PEG-silane.

18. The functional surface of claim 17, wherein said substrate is composed of SiO_2/Si.

19. The functional surface of claim 17, wherein said substrate is composed of thermoplastic or thermoset polymers.

20. The functional surface of claim 17, wherein said substrate is composed of metal/metal oxide.

21. The functional surface of claim 1, wherein said active component is methoxy-PEG-silane.

22. The functional surface of claim 1, wherein said active component is a combination of methoxy-PEG-silane and biotin-PEG-silane.

23. The functional surface of claim 22 further comprising streptavidin immobilized within the enmeshed matrix.

24. The functional surface of claim 1, wherein said active component is vinylsulfone-PEG-silane.

25. The functional surface of claim 24, wherein said substrate is composed of glass.

26. The functional surface of claim 1, wherein said active component is NHS-PEG-silane.

27. The functional surface of claim 1, wherein said active component is COOH-PEG-silane.

28. The functional surface of claim 1, wherein said active component is SPA-PEG-SPA.

29. A functional surface for performance of a biochemical binding assay comprising:

a substrate;

a non-specific binding matrix affixed to said substrate; and

an active component affixed to said non-specific binding matrix, thereby forming a functional surface for a biochemical binding assay.

30. The functional surface of claim 29, wherein said non-specific binding matrix further comprises a cross-linking component and a matrix-forming component providing cross-linked stabilization of said functional surface and bonding to said substrate.

31. The functional surface of claim 29, wherein active component further comprises a functional group, a spacer group and a binding group, said binding group being affixed to said non-specific binding matrix.

32. The functional surface of claim 31, wherein said functional group facilitates specific binding of a target protein to said active component.

33. The functional surface of claim 32, wherein said active component is biotin.

34. The functional surface of claim 32, wherein said active component is vinylsulfone.

35. The functional surface of claim 32, wherein said active component is NHS.

36. The functional surface of claim 32, wherein said active component is SPA.

37. The functional surface of claim 29 wherein said non-specific binding matrix is comprised of effective amounts of azido-silane and polyoxyethylene sorbitan tetraoleate.

38. The functional surface of claim 29, wherein said substrate is selected from the group consisting of: a silica-based substrate, a metal substrate, a metal oxide substrate, a hydrogel substrate, a glass substrate and a polymer substrate.

39. The functional surface of claim 29, wherein said cross-linking component is azido-silane.

40. The functional surface of claim 29, wherein said matrix-forming component is polyoxyethylene sorbitan tetraoleate.

41. A packaged formulation for preparing functionalized surfaces having low non-specific binding characteristics suitable for application to a substrate comprising an effective amount of active component, an effective amount of a cross-linking component and an effective amount of matrix forming component, whereby said active component, said cross-linking component and said matrix forming component form an integrally enmeshed matrix that provides a functionalized surface having low non-specific binding characteristics; and instructions to apply the components onto a substrate surface.

42. The packaged formulation of claim 41, wherein said active component includes a functional group, a spacer group and a binding group.

43. The packaged formulation of claim 42, wherein said functional group facilitates specific analyte binding and is selected from the group consisting of biotin, methoxy-polyethylene glycol, N-hydroxy succinimide esters, nitrophenyl esters, carboxylates, vinyls, nitrenes, aldehyde groups, phenylboronic acid, salicylhydroxamic acid, hydroxyl groups, amine groups, imine groups, carboxylic acids, aldehydes, ketones, esters, ethers, amide groups, imides, cyanides, hydrazides, succinimides, maleimide, thiols, halides, azido groups, phenyl groups, sulfonates, isothiocyante, isocyanate, oxazolines, epoxides, nitrobenzyls, oxazoline, acid chloride, chloroformate, disulfide pyridyl, azlactone, cyanogens bromide, fluoroarenes, fluorocarbons, disulfides, isocyanides, sulfates, heparin, peptides, nucleotides, polynucleotides, organic silicon compounds and organic phosphate compounds, ethylene glycol oligomers, acrylamides, pyrollidones, polysaccharides and polar synthetic polymers.

44. The packaged formulation of claim 42, wherein said functional group facilitates specific analyte binding and is biotin, methoxy-polyethylene glycol, , succinimidyl propionate, streptavidin, or aldehyde.

45. The packaged formulation of claim 42, wherein said functional group facilitates specific analyte binding and is biotin.

46. The packaged formulation of claim 42, wherein said spacer group is selected from the group consisting of bifunctional, linear, star-shape, and comb-like polyethylene glycols (PEG oligomers or polymers), polyethylenimines, polystyrene, polysiloxanes, polyurethanes, proteins, poly(amino acids), polypyrollidones, polyphosphazenes, telechelic surface-active block copolymers (e.g., Pluronics^{TM}), polyacrylates, polyacrylamides,

polymethacrylates, polysaccharides, saccharide monomers, proetoglycans, glycosaminoglycans, dendrimers, hyperbranched polymers.

47. The packaged formulation of claim 42, wherein said spacer group is a linear polyethylene glycol (PEG oligomer or polymer), star-shape PEG molecule, or a comb-like PEG molecule.

48. The packaged formulation of claim 42, wherein said spacer group is a linear PEG molecule.

49. The packaged formulation of claim 42, wherein said binding group is selected from the group consisting of silanes, methacrylates, SPA, disulfides, disilazanes, sulfhydryls, acrylates, carboxylates, isonitriles, isocyanates. and phosphoamidites, nitrenes, epoxides, hydrosilyl, esters, aranes, azidos, nitriles, quinones, and vinyl groups.

50. The packaged formulation of claim 42, wherein said binding group is alkoxysilane or chlorosilane.

51. The packaged formulation of claim 42, wherein said binding group is an alkoxysilane.

52. The packaged formulation of claim 42, wherein said binding group is SPA.

53. The packaged formulation of claim 42, wherein said cross-linking component is a molecule comprised of at least two reactive groups selected from the list consisting of methacrylates, acrylates, epoxides, silanes, perfluorophenyl azides, aryl azides, acyl azides, azidoformates, sulfonyl azides, phosphoryl azides, diazoalkanes, diazoketones, diazoacetates, beta-keto-alpha-diazoacetates, aliphatic azo, diazirines, ketenes, photoactivated ketones, dialkyl peroxidases, diacyl peroxidases, and quinones.

54. The packaged formulation of claim 42, wherein said cross-linking component is azido silane.

55. The packaged formulation of claim 42, wherein said matrix-forming component is selected from the group consisting of polyoxyethylene-based surface-active substances, including, polyoxyethylene sorbitan tetraoleate, polyoxyethylene sorbitol hexaoleate, polyoxyethylene 6 tridecyl ether, polyoxyethylene 12 tridecyl ether, polyoxyethylene 18

tridecyl ether, Tween® surfactants, Triton® surfactants, polyoxyethlene-polyoxypropylene copolymers, linear PEG molecules, star-shaped PEG molecules, comb-shaped and dendrimeric, hyperbrached PEG molecules, linear, star, and dendrimer polyamine polymers, carbonated, perfluorinated and siliconated surfactants, and casein, serum dilutions, bovine serum albumin, glycolipids and lipids, heparin, muscin and polysaccharides.

56. The packaged formulation of claim 42, wherein said matrix-forming component is polyoxyethylene sorbitan tetraoleate, Tween®,surfactant, or Pluronic® block co-polymers.

57. The packaged formulation of claim 42, wherein said matrix-forming component is polyoxyethylene sorbitan tetraoleate.

58. A functional surface for use in detecting a target analyze in a bio-analytical assay comprising:

a substrate for performing the bioanalytical assay;

a means coated over said substrate for limiting non-specific binding during the detection of said target analyte.

59. The functional surface of claim 58 wherein the bioanalytical assay is a microarray.

60. The functional surface of claim 59 wherein the microarray is a oligonucleotide microarray.